

## EPIDEMIOLOGICAL CHARACTERISTICS OF LARYNGEAL CANCER IN THE POPULATION OF THE NIŠAVA DISTRICT

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The objective of the paper was to evaluate the epidemiological characteristics of laryngeal cancer in the Nišava District in the last 10 years.

Published data from the Population Cancer Registry (Serbia) for the period 1999 to 2008 was used. Age-standardized incidence and mortality rates were calculated, according to the standard world population. The rates were calculated per 100.000 inhabitants. Population data were obtained from the National Census 2002. Linear trend was calculated, too.

During the period 1999-2008, a total number of 440 cases of laryngeal cancer was registered – there were 401 (91.1%) males and 39 (8.2%) females. The average age of patients was similar (male: 61.7±10.97 vs female: 61.8±12.3). In the observed period, the average annual standardized incidence rate was 75.39 (145.77 in males and 11.16 in females). Value of linear incidence trend in males was  $Y=0.5565x+9.422$ ,  $R^2=0.4554$  compared to the linear incidence trend of laryngeal cancer in females  $Y=0.1426x+0.3807$ ,  $R^2=0.3347$ . During the entire observation period, a total number of 189 deaths of laryngeal cancer was registered, 176 (93.1%) in males and 13 (6.9%) in females. The average annual-standardized mortality rate was 15.14 (29.67 in males and 0.17 in females). Value of mortality trend in males was  $Y=0.5238x+1.3333$ ,  $R^2=0.4394$  compared to the value of mortality trend in females  $Y=0.0143x+0.3663$ ,  $R^2=0.0558$ . In 204 (80.3%) patients, the histological type of cancer was squamous cell carcinoma. According to localization, approximately two thirds had a glottic cancer while one-third of the cancers were supra- or subglottic cancers.

The research period showed that men suffered more and died from laryngeal cancer, i.e. a slight increase in disease incidence and mortality was observed in men, whereas in females only increase in disease incidence was observed. *Acta Medica Medianae* 2014; 53(4):10-14.

**Key words:** incidence, laryngeal cancer, mortality

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### Introduction

Laryngeal cancer is the second most common malignancy of head and neck (1). Increasing incidence trends are seen in Central and Eastern Europe and in the most developing countries, while in North America and Western Europe the incidence and mortality have either leveled off or are decreasing (2).

Among females, increasing incidence has been reported from Canada, Italy, Denmark, United States and Australia. Mortality rates from this cancer is particularly high among males from Eastern and Southern Europe. South America (Southern Brazil, Uruguay and Argentina) shows the highest mortality rates in males, worldwide (3).

Mortality due to this cancer is very rare among females, accounting for only 0.4% of all deaths due to cancer worldwide.

In Serbia, laryngeal cancers account for 3.7% of the overall newly diagnosed cancers in males and for 0.5% in women. Laryngeal cancers account for 0.6% in men and 0.1% in females of all cancer deaths.

According to data from developed countries, the prognosis for all patients with laryngeal cancer has remained unchanged since the mid-1970s, with a relative survival rate of 60-65% after five years, for all stages and all forms of treatment (4).

**Aims**

The aim of the paper was to evaluate the epidemiological characteristics of laryngeal cancer

in the population of the Nišava District in the period 1999-2008.

## Methods

The data were obtained from the Population Based Cancer Register (Serbia). The study period was from 1999 to 2008. The study consisted of all the cases registered under the clinical diagnosis codes 320 to 329 over the period January, 1999 to December 31, 2008 according to the 10<sup>th</sup> revision of the International Classification of Diseases (ICD-10).

Crude incidence and mortality rates were calculated per 100.000 inhabitants (estimated Census). Standardization was performed by direct method of standardization, with the World population as the standard (5).

For registration, grouping, graphical and tabular representation of the data, Microsoft Excel 2003 software was utilized. Results were obtained using the SPSS software, version 10.0, with in this analysis the statistical boundary of an error was within 0.05 (5%).

Incidence and mortality trends were described in general for male and female population for the entire observed period, based on age-standardized incidence and mortality rates.

## Results

1. Descriptive characteristics of studied patients

During the period 1999-2008, a total number of 440 cases of laryngeal cancer was registered, 401 (91.1%) were males and 39 (8.2%) were females. The average age of males was  $61.7 \pm 10.97$  years (range 34-86) and  $61.8 \pm 12.3$  years for females (range 36-86).

Among 189 patients who died from laryngeal cancer in the period 1999 to 2008, there were 176 (93.1%) males and 13 (6.9%) females. In 204 (80.3%) patients, the histological finding was squamous cell carcinoma (SCS).

Two thirds of patients of patients (254) had glottic cancer, while approximately one-third of the cancers were supra- or subglottic.

2. Incidence trend of laryngeal cancer in males and females in the Nišava District in the period from 1999 to 2008

According to the data in Chart 1, a steady increasing incidence trend was observed both in males and females in the study period.

An increasing incidence trend of laryngeal cancer in males based on the standardized incidence rates was registered. The lowest age-standardized incidence rate in males 7.14/100 000 was observed in 2000 and the highest one of 15.46/100 000 in 2007.

During the period of observation, the incidence trend in males was higher compared with the females (Chart 1).

Value of incidence trend in males:  
 $Y=0.5565x+9.422$   $R^2=0.4554$

There was an increasing linear incidence trend of laryngeal cancer in females, too.

Value of incidence trend in females:  
 $Y=0.1426x+0.3807$ ,  $R^2=0.3347$

The lower standardized incidence rate was 0.38/100 000 (2002) and the highest was 2.53/100 000 in 2003. In this study the overall male to female ratio was 13:1.

Mortality trend of laryngeal cancer by gender in the period 1999-2008 is presented in Chart 2.

3. Mortality trend of laryngeal cancer in males and females in the Nišava District in the period from 1999 to 2008

Mortality trend of laryngeal cancer by gender in the period 1999-2008 is presented in Chart 2.

During the entire period of observation, a total number of 189 deaths due to laryngeal cancer were registered, 176 (93.1%) in males and 13 (6.9%) in females.

Value of mortality trend (males):  
 $Y=0.5238x+1.3333$ ,  $R^2=0.4394$

Value of mortality trend (females):  
 $Y=0.0143x+0.3663$ ,  $R^2=0.0558$

There was an increasing mortality trend in males, whereas in females mortality trend stagnated. Rapid increase of mortality rates was recorded in men in 2003 and 2006.

Dying among females of laryngeal cancer was not recorded in the course of several years (2001, 2003, 2005, 2007).

## Discussion

The data from this paper showed a steady increasing incidence trend of laryngeal cancer in both males and females in the Nišava District. A greater increase of incidence was observed in males.

There was an increased mortality trend in males; however, in females this trend stagnated. According to the presented results, laryngeal cancer mortality in females in the Nišava District is substantially lower than in males. The changes over time in time trends of laryngeal cancer between males and females could be partly explained by the difference in the distribution of the main risk factors, tobacco smoking and alcohol consumption (1,2).

The incidence rate was nearly three times higher in Central Serbia and in the Nišava District compared with the same rate in males and females worldwide. In females the incidence rate was higher by 4,7 times compared with the ASR (W) in females worldwide (5).

Laryngeal cancer is generally uncommon in males and very rare in females (2). Laryngeal cancer is the eleventh most common form of cancer among males worldwide (1). In Central Serbia, laryngeal cancer was the sixth most common cancer in males.

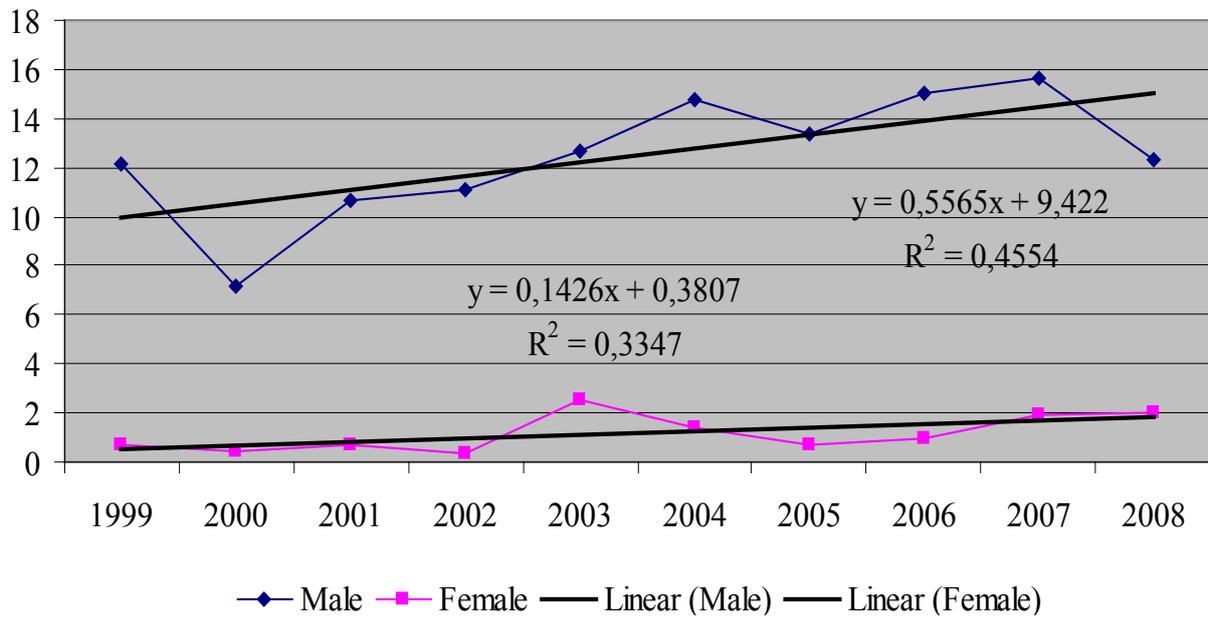


Chart 1. Incidence trend of laryngeal cancer in Nišava District from 1999 to 2008

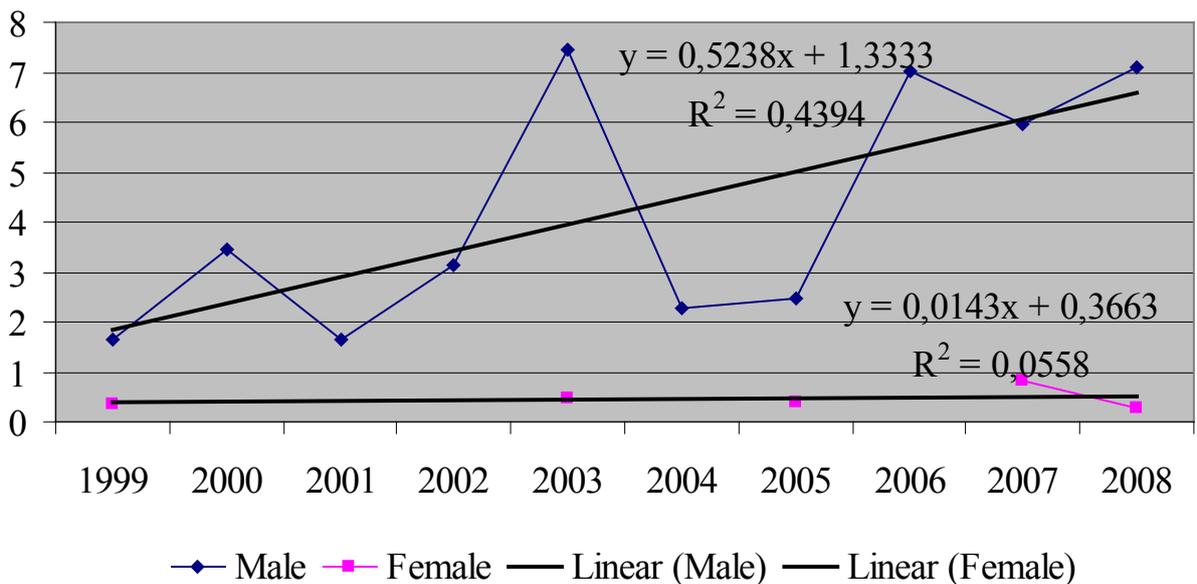


Chart 2. Mortality trend of laryngeal cancer in the Nišava District from 1999 to 2008

In view of its incidence in 2008, laryngeal cancer ranked sixth in males in the Nišava District, accounting for 3.7% of all malignant neoplasms. It accounts for 0.6% of all malignant neoplasms in females (5). In Brasil, it accounts for 3.8% in males and 0.6% in females of all deaths by cancer (4).

According to the data from Globocan, the ASR (W) for males in 2008 was 4.1 and for females 0.6. The same rate among males in the Central Serbia was 13.5 and in the Nišava District the rate was higher, and its value was 14.5. In the same year, ASR (W) in females in Central Serbia was 1.4 and it was slightly lower in females in the Nišava District, 1.2.

After a steady increase since the 1950s, laryngeal cancer mortality has tended to level off since the early 1980s in men in most European countries (3). Age-standardized mortality rate in men in Central Serbia was 5.9 and in the Nišava District the age-standardized mortality rate in males was 5.2. In females age-standardized mortality rate was 0.5, and in the Nišava District it was 0.1 (5). Mortality of males from laryngeal cancer was 2.2. and mortality of females was 0.3.

According to the presented results, the average age of the studied patients was similar:  $61.7 \pm 10.97$  in males and  $61.8 \pm 12.3$  in females.

The disease is predominantly found in patients aged from 50 to 70 years, although in deve-

loping countries many cases are diagnosed in individuals in their fifth decade of life.

The majority of the patients in this study were males (93% vs 7%). Dechaphunkul also found out that 92.3% of patients were males (1). Raitiola showed similar data, there were 95% of males and only 5% of females (6).

In this study, males suffered from laryngeal cancer 13 times more than females. The overall sex ratio was 13:1. Worldwide, its values varies between 4:1 and 20:1 (4), with an increasing proportion of females as a common finding (7).

According to the case-control study done by Arsenijevic et al., 91% of the patients with laryngeal cancer were males with mean age of 60 years.

In a case-control study conducted in the Metropolitan Region of Sao Paulo, between January 1999 and December 2001, 63% of the laryngeal cancer cases occurred in the age group from 50 to 70 years (4).

On average, the patients from this study were younger than patients from other studies. The median age of the patients from Finland was 64 years.

According to our findings, in 80.3% of all studied patients, the histological finding was SCS, which is less than in the reference literature. For example, Raitiola showed that 98% of all patients in their study had SC laryngeal cancer (6).

According to data from developed countries, the prognosis for all patients with laryngeal cancer has remained unchanged since the mid-1970s, with a relative survival rate of 60-65% after five years, for all stages and all forms of treatment (8).

According to the presented results, there

were 54.3% patients younger than 64 who died from laryngeal cancer, and the remaining 45.7% were older than 65. Piccirilo et al. found around 66% of people who had laryngeal cancer older than 60 years of age (9).

In 1994, the majority of laryngeal cancers in England and Wales was recorded as occurring in the area of the glottis, followed by the supra-glottis, with a small proportion in the subglottis and laryngeal cartilages. A large portion remained unspecified (10).

In this study, in 204 (80.3%) patients the histological finding was SCC and it accounts for more than 90%. Squamous cancer was by far the most common histology (6).

The overall improvement in the prognosis was observed in Europe from 1978 to 1989, where the five-year survival increased from 58% to 63% (6-9).

In the period 2003-2007, in the United Kingdom, one-year survival rate for laryngeal cancer was 85% and five-year survival rate was 66% (10).

Survival has decreased among patients with laryngeal cancer during the past two decades in the United States, and during the same period there was an increase in the non-surgical treatment of laryngeal cancer (11).

## Conclusion

An increasing incidence and mortality trend was found among patients with laryngeal cancer in the population of the Nišava District. Earlier diagnosis and better adoption of integration therapeutic schemes may also have favorably influenced laryngeal cancer survival rates and consequently mortality trends.

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## EPIDEMIOLOŠKE KARAKTERISTIKE KANCERA LARINKSA KOD POPULACIJE NIŠAVSKOG OKRUGA

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Cilj rada bio je da se analiziraju epidemiološke karakteristike oboljevanja i umiranja od raka larinksa na teritoriji Nišavskog okruga u poslednjih 10 godina.

Korišćeni su publikovani podaci Nacionalnog registra za rak (Srbija) za period 1999-2008. Izračunavane su standardizovane stope incidencije i mortaliteta prema standardnoj populaciji sveta. Stope su izračunavane na 100 000 stanovnika. Računat je linearni trend incidencije i mortaliteta. Podaci o populaciji dobijeni su iz popisa 2002. godine.

U periodu 1999-2008. registrovano je ukupno 440 obolelih od raka larinksa i to 401 (91.1%) muškarac i 39 (8.2%) žena. Starost bolesnika bila je slična (muškarci:  $61.7 \pm 10.97$  vs žene:  $61.8 \pm 12.3$ ). Prosečna godišnja standardizovana stopa incidencije iznosila je 75.39 (145.77 muškaraci vs 11.16 žene). Blagi porast linearnog trenda incidencije zabeležen je i kod muškaraca i kod žena ( $Y=0.5565x+9.422$   $R^2=0.4554$  vs  $Y=0.1426x+0.3807$ ,  $R^2=0.3347$ ). Ukupno je umrlo 189, a od toga 176 (93.1%) muškaraca i 13 (6.9%) žena. Prosečna godišnja standardizovana stopa mortaliteta iznosila je 15.14 (29.67 muškarci vs 0.17 žene). Prisutan je bio blagi porast trenda mortaliteta kod muškaraca, dok je kod žena uočena stagnacija ( $Y=0.5238x+1.3333$ ,  $R^2=0.4394$  vs  $Y=0.0143x+0.3663$ ,  $R^2=0.0558$ ). Prema patohistološkom tipu, 204 (80.3%) bolesnika imalo je planocelularni rak laringsa. Prema lokalizaciji, dve trećine bolesnika imalo je rak glotisa, a jedna trećina supra- ili subglotični rak.

U ispitivanom periodu može se uočiti da su od raka larinksa nešto više obojevali i umirali muškarci, tačnije utvrđen je blagi porast trenda incidencije oboljevanja i mortaliteta kod muškaraca, dok je kod žena utvrđen samo porast oboljevanja. *Acta Medica Medianae* 2014;53(4):10-14.

**Ključne reči:** incidencija, kancer larinksa, mortalitet